GERMFREE

THEORETICAL AND TECHNICAL INSTRUCTION MANUAL

Advanced Horizontal Laminar Flow Hood

BZ Series

GERMFREE

Advanced Horizontal Laminar Flow Hood

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Table of Contents

Introduction	**3**
Installation	**3**
Services	**4**
Airflow	**4**
Airflow Diagram	**5**
Use of the BZ series hood	**6**
Maintenance	**8**
Parts List	**10**

D R A W I N G S

BZ 3 Line Drawing	**12**
BZ 4 Line Drawing	**13**
BZ 8 Line Drawing	**14**
BZ 3 Wiring Diagram	**15**
BZ 4 Wiring Diagram	**16**
BZ 6 Wiring Diagram	**17**
BZ 8 Wiring Diagram	**18**

Introduction

BZ SERIES

ADVANCED HORIZONTAL LAMINAR FLOW STATION

The BZ Series Hood is designed for the handling of materials in a sterile working environment. The work area is bathed by positive pressure horizontal laminar flow air that has passed through a High Efficiency Particulate Air (HEPA) filter. This filter removes organisms and particulates 0.3 micron in size with an efficiency of 99.99%. It is even more efficient for both larger and smaller particles. The laminar flow principle consists of moving individual streams of unidirectional, ultra-clean air along parallel lines with minimal turbulence. The HEPA filter is positioned in the rear of the work area. It is protected by a removable, perforated metal diffuser located immediately in front of it.

Your **BZ Series Hood** has been thoroughly tested. The HEPA filter was integrity tested by the filter manufacturer and again at our factory before it was shipped out. During the testing process, dioctylphthalate (DOP) or equivalent was aerosolized into the assembled unit on the upstream side of the HEPA filter and an aerosol photometer was used to scan the downstream side for any aerosol droplets that might pass through or around the HEPA filter. Air velocity was measured with a thermoanemometer to insure that the airflow is uniform and unidirectional. All testing was performed in accordance with established standards and procedures, including Federal Standard 209.

Installation

The **BZ Series Hood** should be transported and moved in an upright position. Your unit has been shipped fully assembled and needs to be carefully uncrated. The **BZ Series Hood** should be positioned so that it is out of traffic patterns and away from room air currents that could disrupt its airflow. If there is a window in the room it should remain closed at all times. The **BZ Series Hood** should not be placed in a location where air conditioning vents might disturb the flow. A simple smoke test will help determine a proper location for the unit.

After installation, the **BZ Series Hood** needs to be certified by an independent testing organization. This ***must*** be done before it is placed into service and repeated in accordance with the regulations from the pharmacy board in your state (usually GMOS-1yr). In addition, whenever the **BZ Series Hood** is moved, it ***must*** be certified.

Services

All **BZ Series Hoods** are shipped complete and include the following accessories: Variable speed blower motor control (BZA-5), metal diffuser in front of supply filter (BZA-15), one or two extra prefilter sets (BZA-22PF) and any other accessories ordered at the time of purchase. In addition to the above, the Pharmacy Models (RX) include a stainless steel I.V. bar (BZA-9) with hooks.

All electrical components are located in the control panel/light housing and the main cabinet body. The fluorescent light components and switches (fluorescent lights left, motor blower right) are located in the overhead control panel/light housing. The motor blower, speed control and circuit breaker are mounted in the main body. The circuits are completed through the pre-grounded plug and socket located behind the control panel/light housing on the right side.

The unit's speed control has been set at the factory. Adjustments may occasionally have to be made during certification. The speed control setting should only be changed if air velocity falls below the specified range, which usually takes several years. This should only be done by your certifier. **Do not adjust the speed control without good reason.**

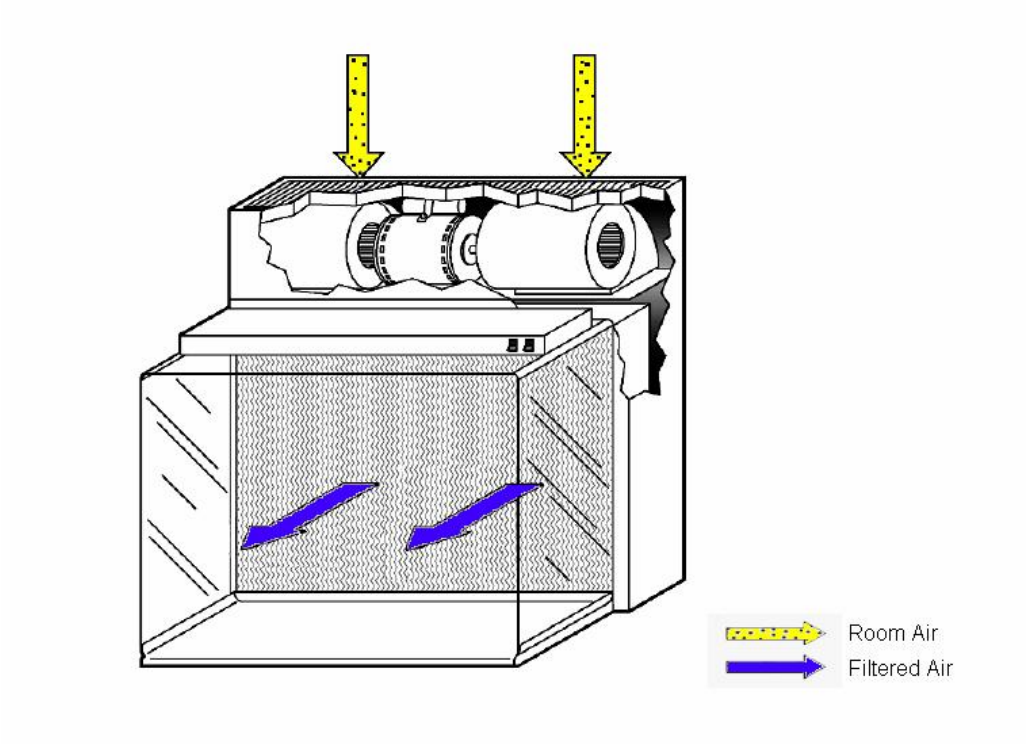
Airflow

The Blower Motor is extremely efficient throughout a wide pressure range; it will overcome the resistance of both a clean and moderately loaded HEPA filter. The variable speed control is set at the factory to give a unidirectional airflow of 90-120 linear feet per minute with a thermoanemometer or velometer.

As the HEPA filter becomes "loaded" with particulate matter, the blower will overcome a considerable increase in resistance without having to be reset. Eventually, the speed control will reach the maximum setting. At this point, the hot wire to the motor should be reconnected to the next higher power level. Over time the filter will become loaded requiring an adjustment of the speed control. To best determine when the filters should be changed, direct readings of airflow in feet per minute should be taken. This is usually done with a velometer or thermoanemometer.

If a thermoanemometer or velometer is not available to quantitatively measure airflow, a very rough indication can be made with smoke by creating a smoky condition in front of the unit and observing the relative rate and pattern of dissipation.

AIRFLOW DIAGRAM



Use of the BZ Series Hood

The **successful use** of the BZ Series Hood depends upon two factors: **advance planning** and **good technique**. Even the most sophisticated and elaborate system would be useless if proper technique were not employed. The head of the involved department should make sure that personnel who use the unit are trained and exercise good technique.

ADVANCE PLANNING

To achieve maximum sterility from your unit, you must take into account the equipment and materials necessary for the proposed project and outline the procedural details for your particular operation.

The best way to accomplish this is to use a checklist and/or protocol for both materials and procedures. Materials should include equipment, apparatus, media, supplies, diluents, drugs and all other items that will be used. The procedural checklist should include the order of events in sequence and other details that are necessary for the successful completion of the proposed operation or experiment.

Your advance planning should include a layout for the arrangement of items in the work area. **This should be planned so that, if there are dirty items, they are segregated from clean ones. The movement of the dirty items behind clean items should be minimized.** Base your layout on a logical progression for each specific operation. In a complex situation, an ideal arrangement of equipment may not be achievable, so it may be necessary to compromise.

GOOD TECHNIQUE

After the planning phase is complete, the start-up procedure can begin. Turn on the fluorescent lights and the motor blower and let the unit warm up for 5 minutes. After this period, thoroughly clean the stainless steel surface in the work area using a soft, lint free cloth and 70% alcohol.

Periodic cleaning of the plastic surfaces with an acrylic cleaner, available at all home supply or hardware stores, will minimize particle accumulation on these surfaces.

Using your checklist, collect all items for the procedure that will be placed inside the hood. Clean all of these items thoroughly before placing them into the work area. Keep the items at a comfortable distance away from the open front of the unit.

After all the items on the checklist have been arranged in the work area, the unit will have been in operation for at least 10 minutes. Wait an additional 5 minutes before beginning the procedure. This will allow sufficient time for the ultra-clean air passing over the work

area to remove airborne contamination, especially particulate matter from the newly introduced items.

The operator is the critical factor in the successful performance of any BZ Series Hood. It is dangerous to rely on the unit to do all of the work. When properly maintained and operated, the BZ Series Hood will do an excellent job of controlling airborne contamination.

Prior to beginning work inside the hood, the operator should wash her hands and arms with germicidal soap. It is recommended that technicians working in the BZ Series Hood wear long sleeved gowns with knit cuffs and rubber gloves. This will minimize the shedding of skin flora into the work area. Conventional laboratory coats with open cuffs allow the entrapment of contaminated air between the technician's wrist and forearms and the inside sleeves. This contaminated air can thus be introduced into the work area. Abrupt movements of forearms and hands should be avoided. Excessive activity in the room also creates disruptive air currents. Therefore, such activity should be held to a minimum or eliminated when work is being performed.

Maintenance

PREFILTERS

The prefilter is located horizontally on the top of the unit and should be kept in place at all times. The prefilter supplied with the unit is a fiberglass type similar to an air-conditioning filter. Once the unit has been placed into service, the prefilter should be inspected monthly. After it has been determined how long it takes for the prefilter to "load", it should be routinely inspected at this interval to determine if it should be replaced. After some experience is gained, you may prefer to select an arbitrary time to replace the prefilter. Replacement prefilters are available from stock or it may be possible for you to obtain a useable substitute from an air conditioning supply company or hardware store located in your community.

MOTOR BLOWER

The motors blowers were selected because they have the following characteristics: low noise level, low vibration level, compatibility with the variable speed control, and most importantly, the efficiency in delivering air through clean HEPA filters as well as those loaded with a moderate amount of particulate matter. Motors are ¾ h.p. (with 3 power levels), 115V, single phase and 60Hz (220V, 50Hz transformers available). The 3-pronged grounded power cord can be plugged into a standard grounded receptacle.

The motor is located in the center of the blowers. It should rarely be necessary to work on the motor blower assembly. For access to the motor blower, raise the prefilter on the top of the unit. Before servicing the motor, the power cord must be disconnected or, if this is difficult to reach, the fuses should be removed.

FILTER DIFFUSER

The HEPA filter is located behind the removable, perforated metal diffuser. Do not push items such as needles through the diffuser holes and do not hang items from any part of the diffuser. The diffuser should only be removed by your certifier and at that time it can be cleaned.

During routine cleaning, do not spray the diffuser with an aerosol or pump dispenser because you might spray the filter. If an occasional spray mist gets on the filter, it should dry and not cause a problem.

HEPA FILTERS

The average life of a HEPA filter is 3 to 5 years or longer, depending on the cleanliness of the ambient air. A loaded HEPA filter cannot be cleaned or recycled. New filters are available from the factory and we recommend that they be changed by qualified personnel. The filters are accessed from the side of the unit. Both sides of the unit must be open in order to remove the filter. The side panels are removed with a flat-head screwdriver and the filter clamps can be loosened by hand. The filter will then slide out from either side.

Your certifier, using R.T.V. silicone sealant, can repair small holes or tears in the filter medium. The filter must be retested for leaks after any repair is made.

The spill guard edge, located at the work surface, will protect the filter from spills on the work surface. If liquid gets over the spill guard, remove the diffuser and carefully soak the liquid up with the edge of a paper towel or any thin material with good absorbency.

ACRYLIC TOP AND SIDES

The transparent acrylic top and sides of the work area are designed to provide optimal light in the work area. Many chemicals have an adverse effect on acrylic plastics. Never use gritty soaps or household cleansers such as Comet or Ajax. Acrylics are attacked by concentrated alcohols, strong solvents, chlorinated hydrocarbons and many aromatic hydrocarbons. They are also adversely affected by ultraviolet light.

Acrylic is unaffected by most inorganic solvents, minerals and animal oils, low concentrations of alcohols, paraffinic and olefinic hydrocarbons, amines, alkyl monohalides, esters containing more than ten carbon atoms, alkalines, no-oxidizing acids, salt water, photographic solutions and chemicals, petroleum oils and greases, household cleaning products and chemicals used in treating water. **For cleaning, 50% Ethyl Alcohol, 99% Isopropyl Alcohol, or a Clorox solution can be used.** Do not use 95% or 70% Ethyl Alcohol, 99% Methyl Alcohol or Windex.

Parts List

FILTERS

HEPA (High Efficiency Particulate Air)

BZ 3(SS) — 36 x 36 x 6 BZ 4(SS) — 36 x 48 x 6

BZ 6(SS) — 36 x 72 x 6 BZ 8(SS) — 2 @ 36 x 48 x 6

Prefilters:

BZ 3(SS) — 36 1/4 x 12 1/4 x1 BZ 4(SS) — 48 1/4 x 12 1/4 x 1

BZ 6(SS) — 2 @ 36 1/4 x 12 1/4 x 1 BZ 8(SS) - 2 @ 48 1/4 x 12 1/4 x 1

MOTOR/BLOWER

BZ 3(SS) & BZ 4(SS) — 3/4 Hp, 1450 rpm , 7.7 Amp

Double Motor # 7024-1351 (permanent split capacitor)

BZ 6(SS) & BZ 8(SS) — 2 @ 3/4 Hp, 1450 rpm , 7.7 Amp

Double Motor # 7024-1351 (permanent split capacitor)

CAPACITOR

7.5 MFD

G.E. # 6X655

SWITCHES

(2) Rocker, single pole, single throw (on/off)

Carlingswitch # LRGSEK221C, UL & CSA approved

CIRCUIT BREAKER

BZ 3(SS) & BZ 4(SS) —15 Amp

Potter & Brumfield # W58XB1A4A-15, CSA approved

BZ 6(SS) & BZ 8(SS) —20 Amp

Potter & Brumfield # W58XB1A4A-20, CSA approved

SPEED CONTROL

15 Amp. -KB Electronics # KBWC115NS, UL approved

LIGHTING

Fluorescent lights (2 each)

3Ft: F-25T8/741

4,6 & 8 Ft: 32T8/741

FLUORESCENT BALLAST

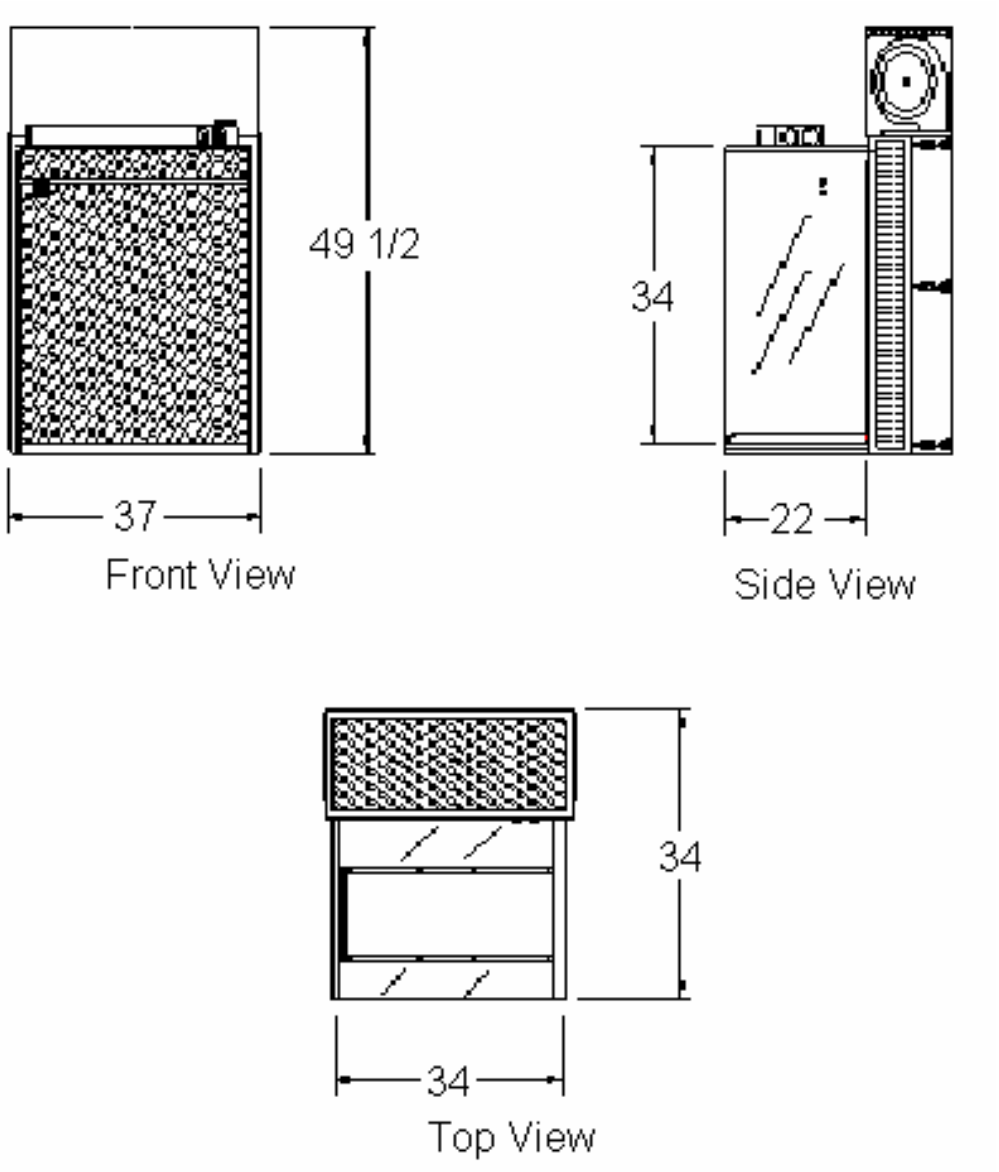
Advance Transformer Ballast #1CN-2P32-SC35M

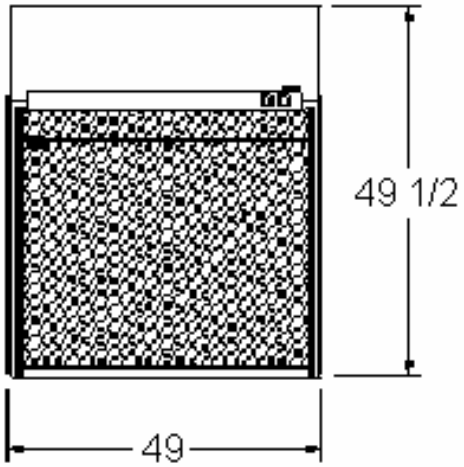
Lamp Holders — (4) Leviton # 11357-N

POWER CORD

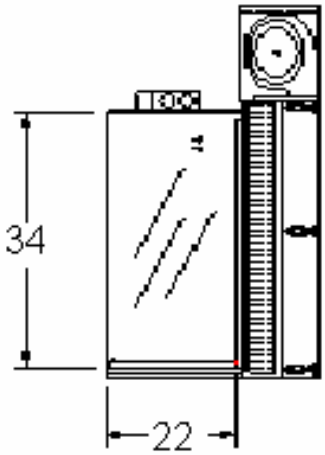
Molded three prong, 8' gray cord # 17510A

Drawings

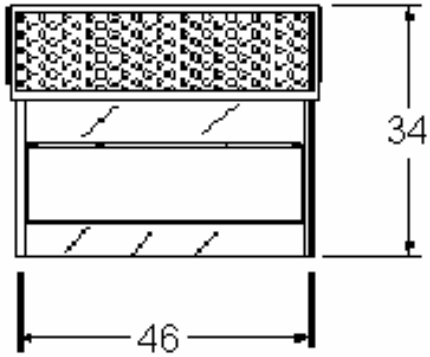




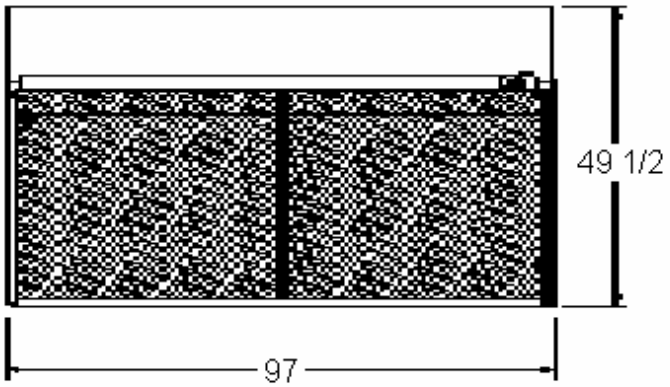
Front View



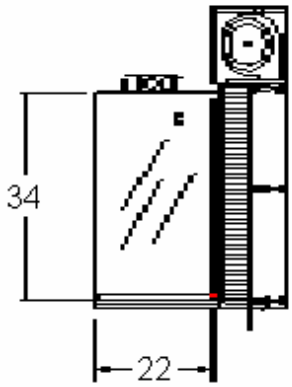
Side View



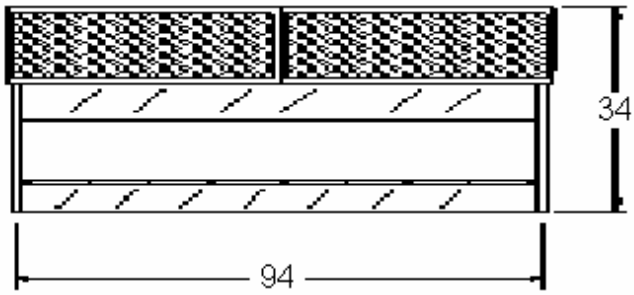
Top View



Front View

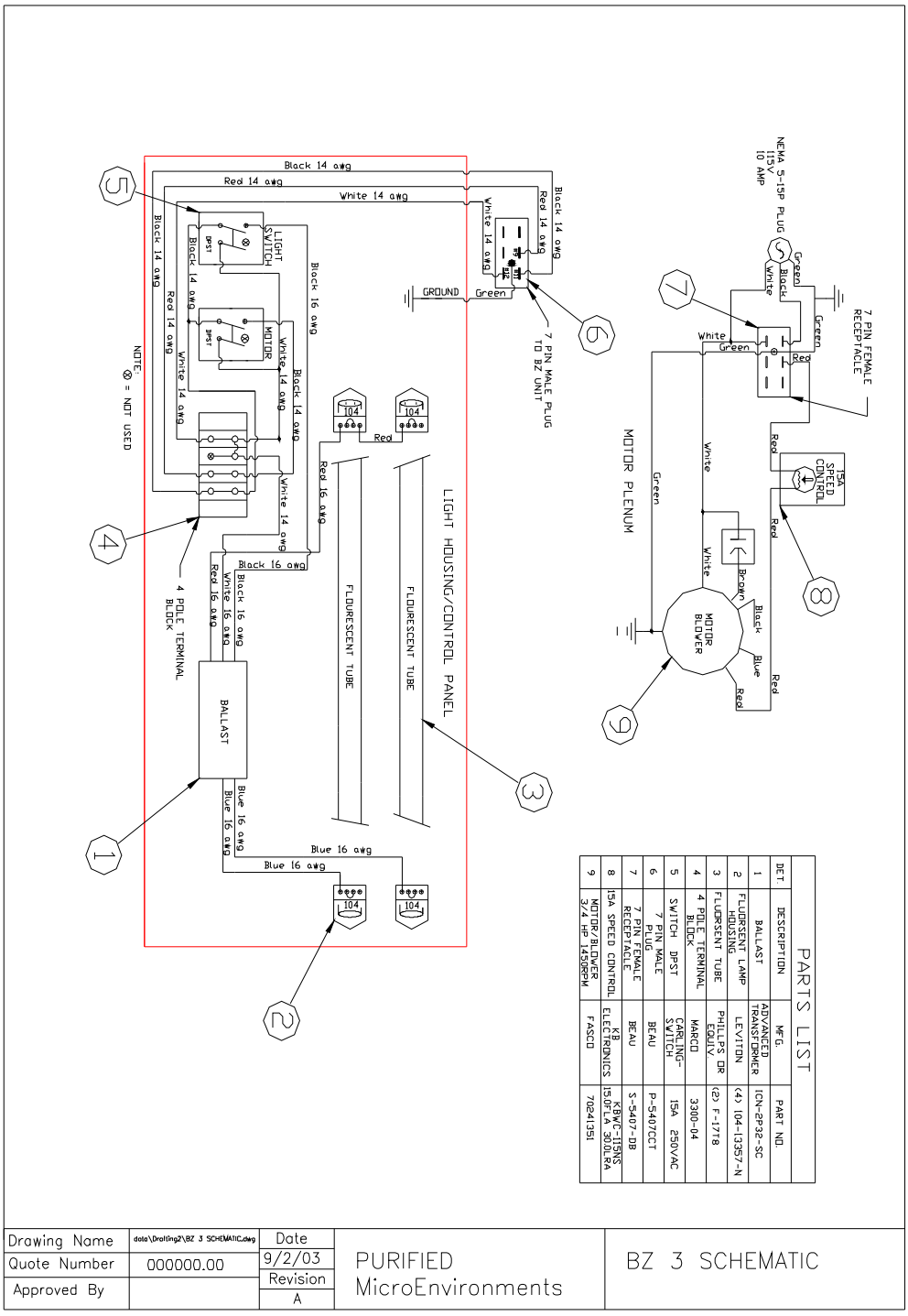


Side View



Top View

BZ 3 WIRING DIAGRAM



PARTS LIST			
DET.	DESCRIPTION	MFG.	PART NO.
1	BALLAST	ADVANCED TRANSFORMER	ICN-2P32-SC
2	FLUORSENT LAMP HOUSING	LEVITON	(4) 104-13357-N
3	FLUORSENT TUBE	PHILLPS DR EQUIV	(2) F-17T8
4	4 PDLE TERMINAL BLOCK	MARCO	3300-04
5	SWITCH DPST	CARLING-SWITCH	15A 250VAC
6	7 PIN MALE PLUG	BEAU	P-5407CCT
7	7 PIN FEMALE RECEPTACLE	BEAU	S-5407-DB
8	15A SPEED CONTROL	K.B. ELECTRONICS	KBWC-115NS 15.0FLA 3600LRA
9	MOTOR/BLOWER 3/4 HP 1450RPM	FASCO	70241351

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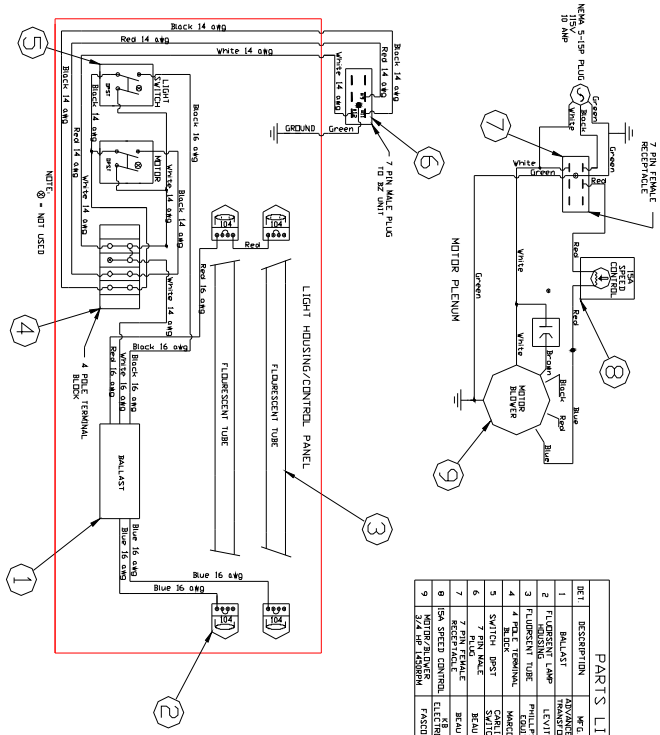
Quote Number	000000.00	9/2/03	BZ 3 SCHEMATIC
Approved By		Revision A	



ITEM	DESCRIPTION	MFG.	PART NO.
1	BALLAST	ADVANCED TRANSFORMER	ION-BP32-SC
2	FLUORESCENT LAMP HOUSING	LEVITON	(4) 134-13257-N
3	FLUORESCENT TUBE	PHILIPS CM	(2) F-25T8
4	4 POLE TERMINAL BLOCK	MARCO	3300-04
5	SWITCH, DPST	CARLING SWITCH	15A 250V-AC
6	7 PIN MALE PLUG	BF4U	P-5407CCT
7	7 PIN FEMALE RECEPTACLE	BF4U	S-5407-DB
8	15A SPEED CONTROL	K&W ELECTRONICS	15/20K-SCR-PA
9	MOTOR/BLOWER 3/4 HP 1450RPM	FASCO	7024135I

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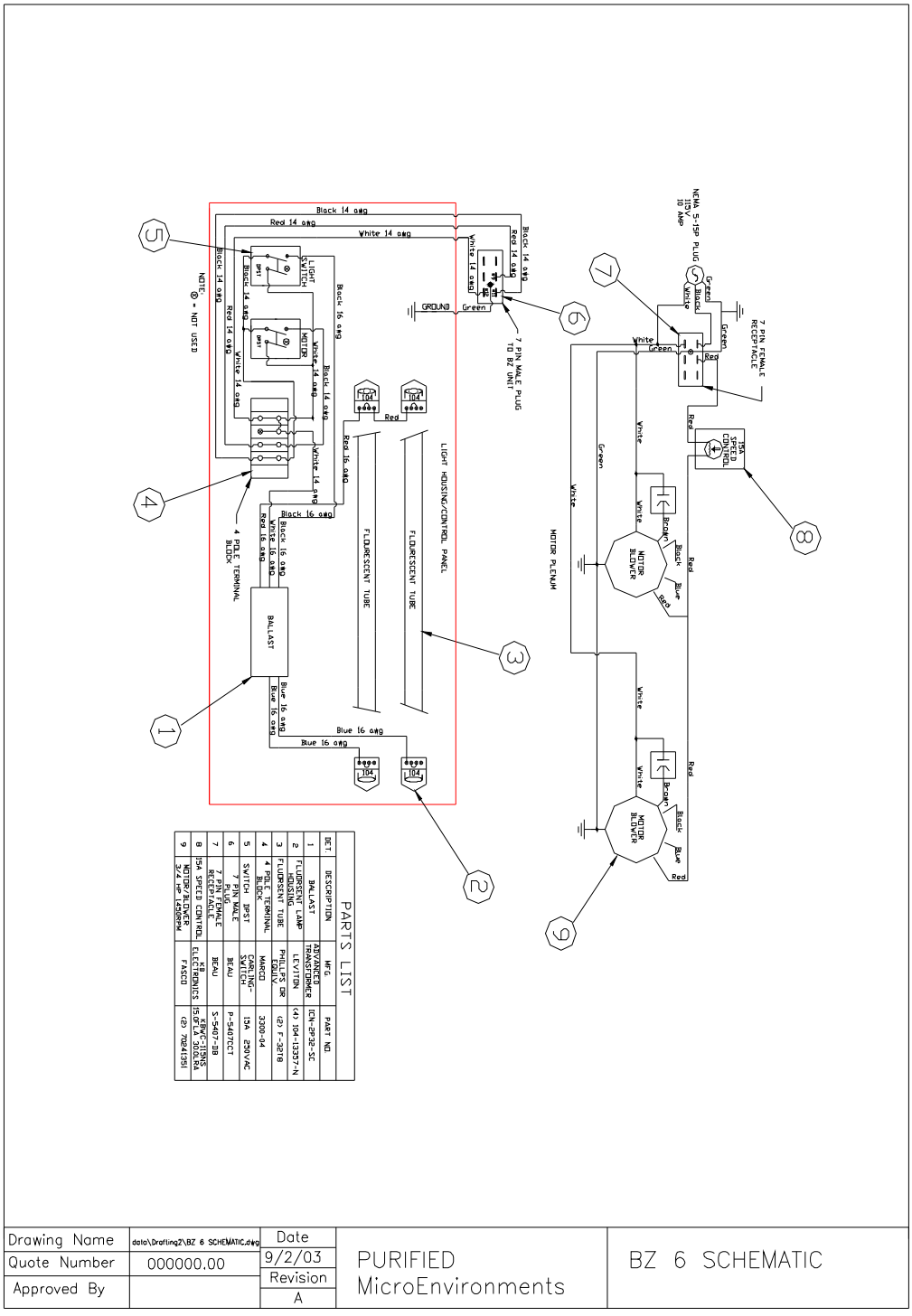
Quote Number	000000.00	9\2/03		
Approved By		Revision A		



PARTS LIST			
DET.	DESCRIPTION	MFG.	PART NO.
1	BALLAST	ADVANCED TRANSFORMER	ICN-2P32-SC
2	FLUORESCENT LAMP W/HOUSING	PHILIPS OR LEVITON	(4) 104-10357-N
3	FLUORSENT TUBE	MARCO	(2) F-32T8
4	4 POLE TERMINAL BLOCK	CARLING-SWITCH	3300-04
5	SWITCH, DPST	BEAU	15A 250VAC
6	7 PIN MALE PLUG	BEAU	P-5407CCT
7	7 PIN FEMALE RECEPTACLE	BEAU	S-5407-DB
8	15A SPEED CONTROL	K&W ELECTRONICS	K&WC-115NS 15.0A 300LMA
9	MOTOR/BLOWER 3/4 HP 1450RPM	FASCO	(2) 7082435I

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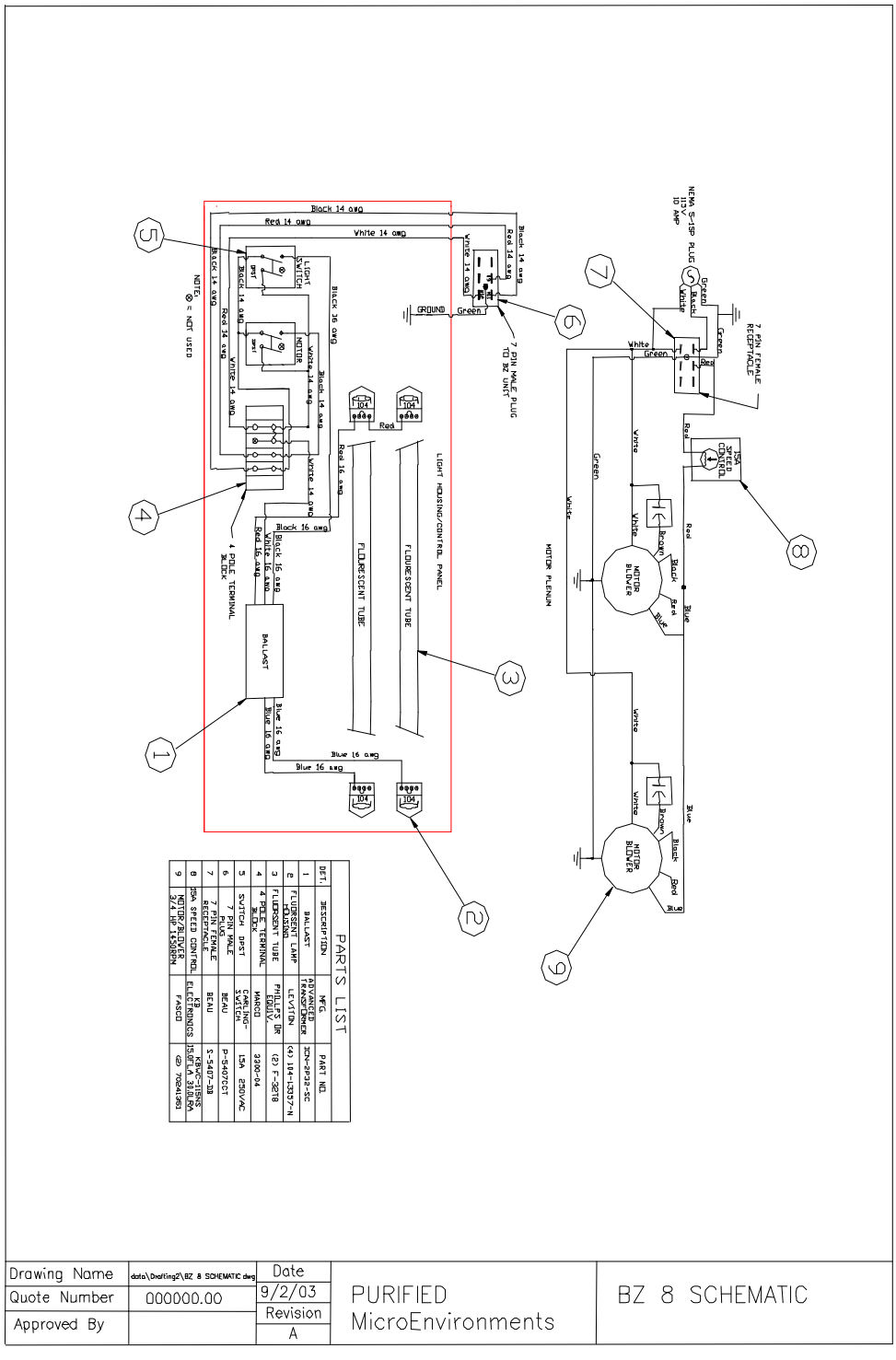
Approved By		Revision A		



DET.	DESCRIPTION	MFG	PART NO.
1	BALLAST	ADVANCE TRANSFORMER	3CH-2P32-SC
2	FLUORESCENT LAMP	LEVITON	(4) 184-13357-N
3	FLUORESCENT TUBE	PHILLIPS DR EQUIV.	(2) F-32T8
4	4 POLE TERMINAL BLOCK	MARCO	2200-04
5	SWITCH DPST	CARLING SWITCH	15A 250VAC
6	7 PIN MALE PLUG	BEAU	P-5407CCT
7	7 PIN FEMALE RECEPTACLE	BEAU	S-5407-3B
8	15A SPEED CONTROL	ELECTRONICS	KBIC-1515RS 15.0FLA 3.0LRA
9	MOTOR BLOWER ASY 1/4 HP 1 SPEED	FASCO	(2) 70541383

Drawing Name	data\Drafting2\BZ 8 SCHEMATIC.dwg	Date	PURIFIED MicroEnvironments	BZ 8 SCHEMATIC
Quote Number	000000.00	9/2/03		
Approved By		Revision A		